Supporting Information for

Waste Polyethylene Terephthalate (PET) Material as Sustainable Precursor for the Synthesis of Nanoporous MOFs, MIL-47, MIL-53(Cr, Al, Ga) and MIL-101(Cr)†

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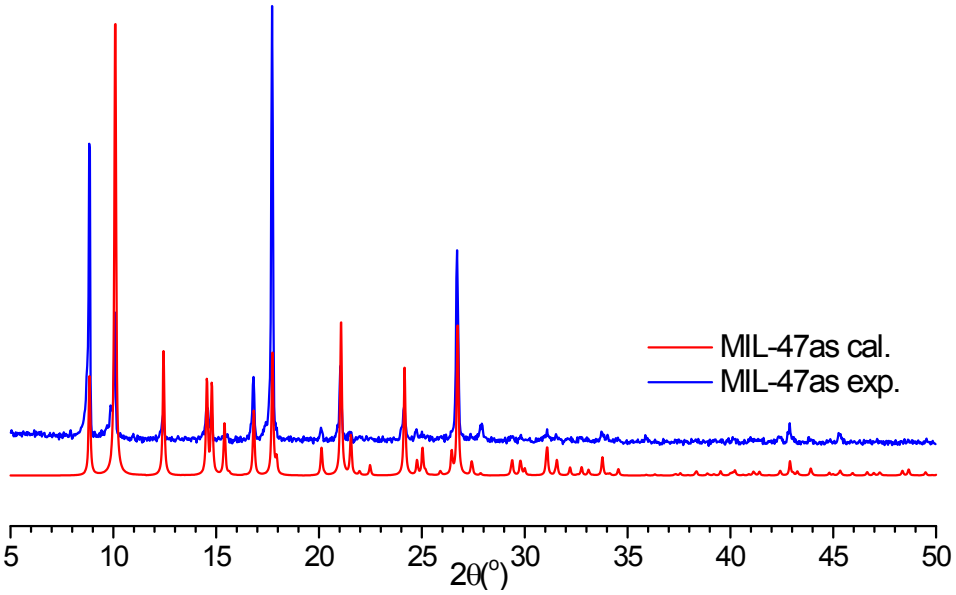

Figure S1. Comparison of PXRD pattern of the solid product obtained in the hydrothermal reaction of VCl_3 (1 mmol) with PET (0.25 mmol), HF (2.0 mmol) and H_2O (4.5 mL) at 200 ºC for 4 d for the synthesis of MIL-47 (as-synthesized), with its calculated PXRD pattern.

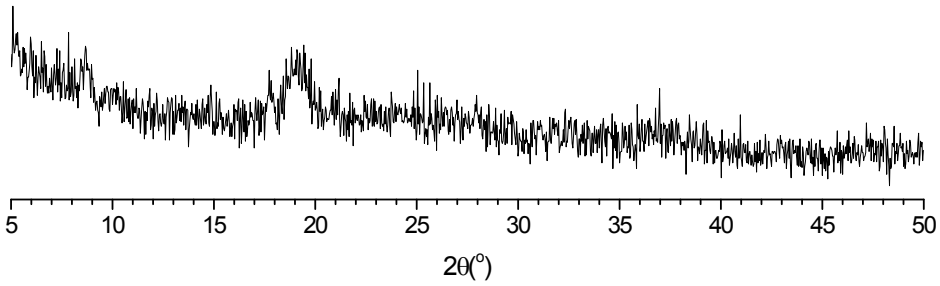

Figure S2. The PXRD pattern of the solid obtained in the hydrothermal reaction of $Cr(NO_3)_3 \cdot 9H_2O$ (1 mmol) with PET (1 mmol), HF (1 mmol), and H_2O (4.8 mL) at 220 ºC for 72 h for the synthesis of MIL-53(Cr).

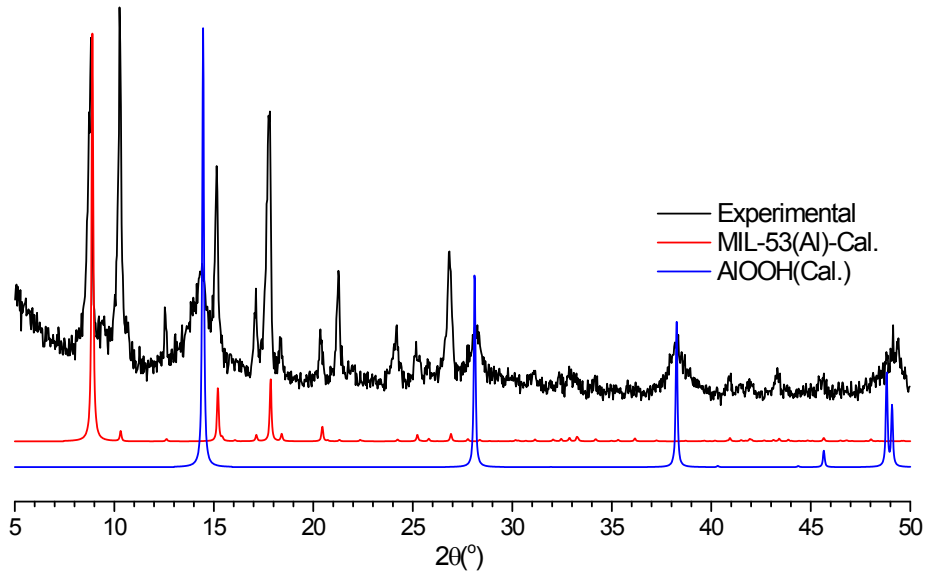

Figure S3. Comparison of PXRD pattern of the solid product obtained in the hydrothermal reaction of $Al(NO_3)_3 \cdot 9H_2O$ (1 mmol) with PET (0.5 mmol), and H_2O (3.0 mL) at 220 ºC for 72 h for the synthesis of MIL-53(Al), with calculated PXRD patterns of AlOOH and MIL-53(Al).

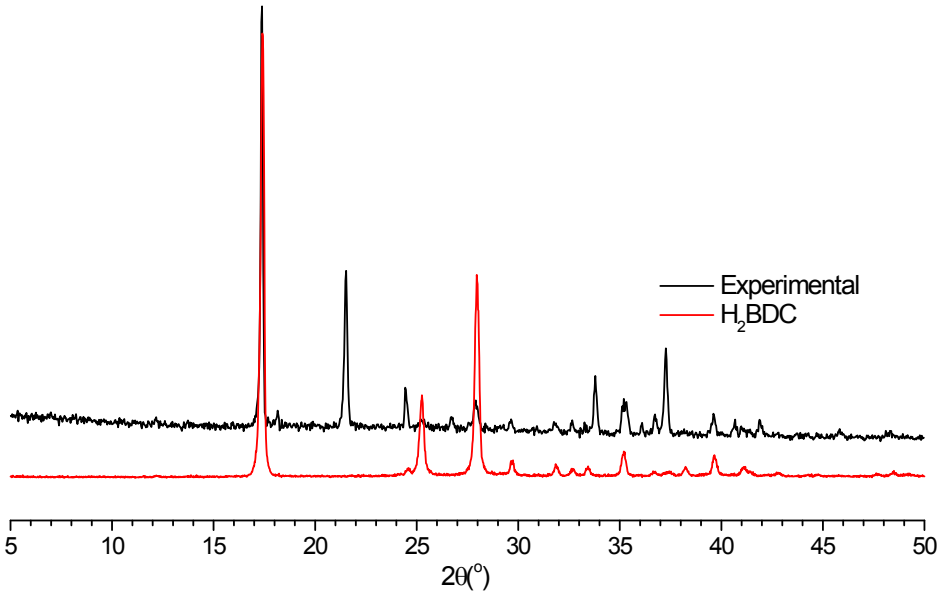

Figure S4. Comparison of PXRD pattern of the solid product obtained in the hydrothermal reaction of $Ga(NO_3)_3 \cdot xH_2O$ (1 mmol) with PET (1 mmol), HF (1.2 mmol) and H_2O (5.0 mL) at 210 ºC for 5 h for the synthesis of MIL-53(Ga), with PXRD patterns of H_2BDC.

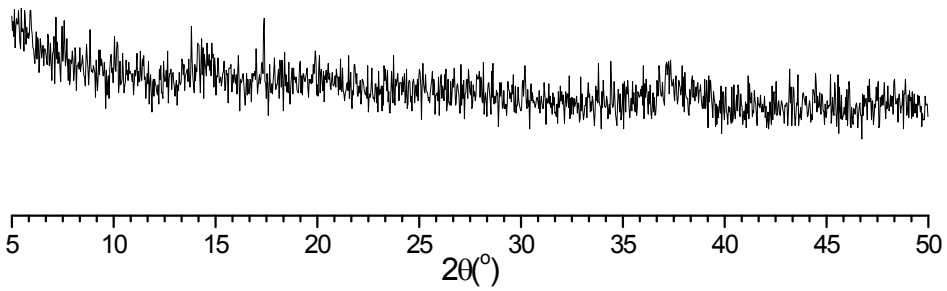

Figure S5. The PXRD pattern of the solid obtained in the hydrothermal reaction of $Cr(NO_3)_3 \cdot 9H_2O$ (1 mmol) with PET (1 mmol), HF (1 mmol), and H_2O (4.8 mL) at 220 ºC for 8 h for the synthesis of MIL-101(Cr).

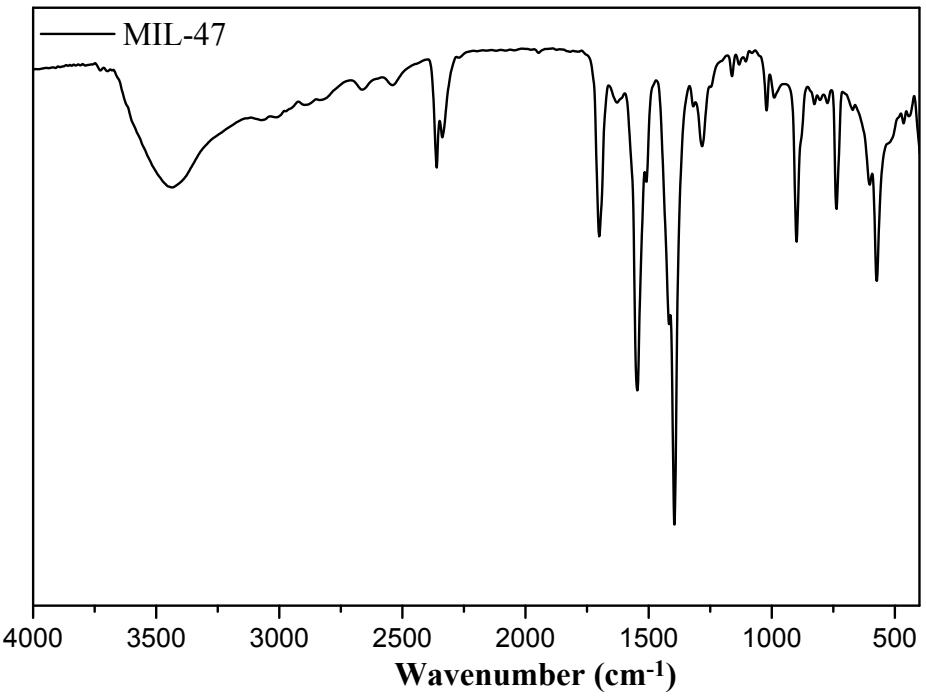

Figure S6. The FT-IR spectrum of activated sample of MIL-47 synthesized using PET as the source of H_2BDC.

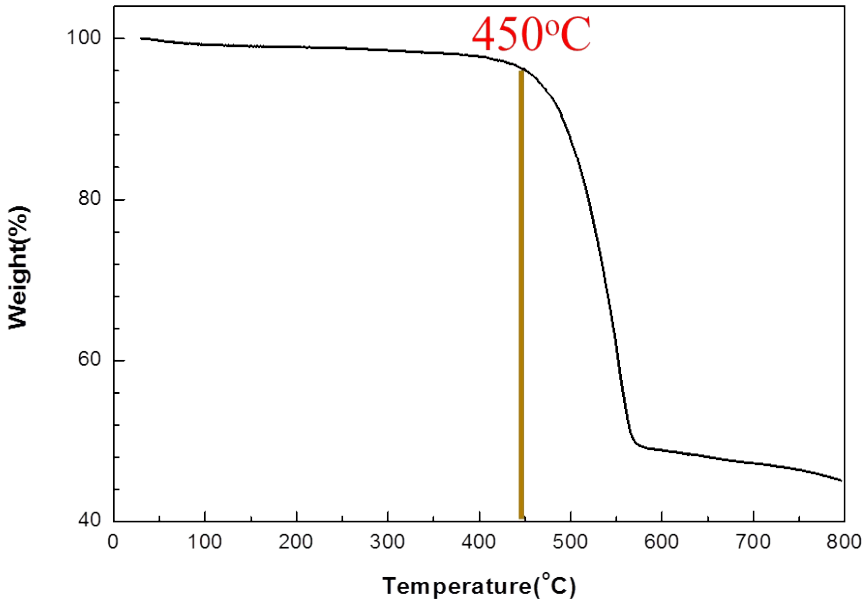

Figure S7. The TGA curve of activated sample of MIL-47 synthesized using PET as the source of H_2BDC.

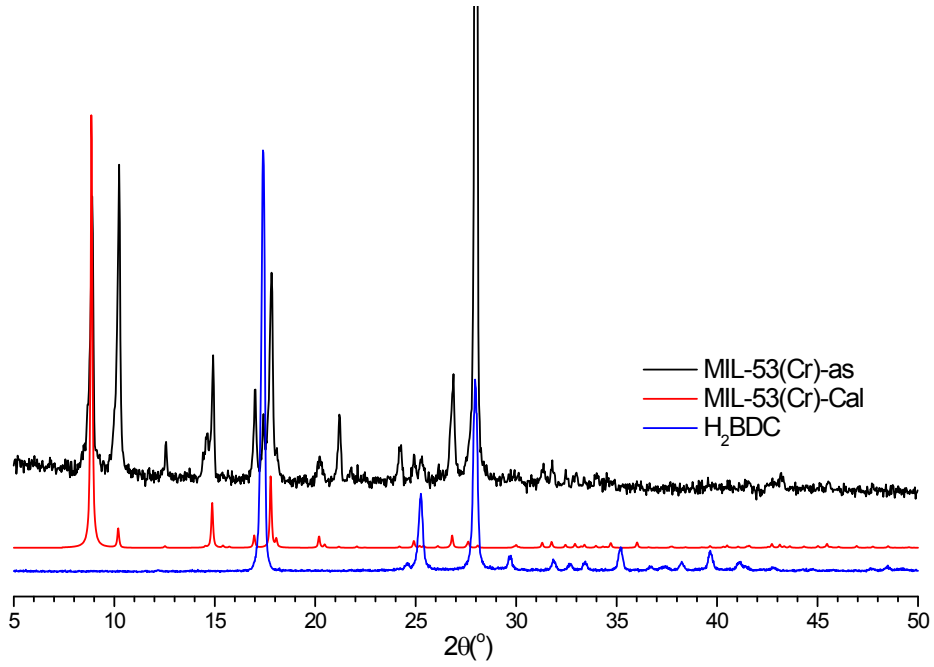

Figure S8. Comparison of PXRD pattern of the product obtained in the hydrothermal reaction of $CrCl_3 \cdot 6H_2O$ (1 mmol) with PET (1 mmol), HF (2 mmol), and H_2O (5 mL) at 160 ºC for 72 h for the synthesis of MIL-53(Cr) with calculated PXRD pattern of MIL-53(Cr) and PXRD pattern of H_2BDC.

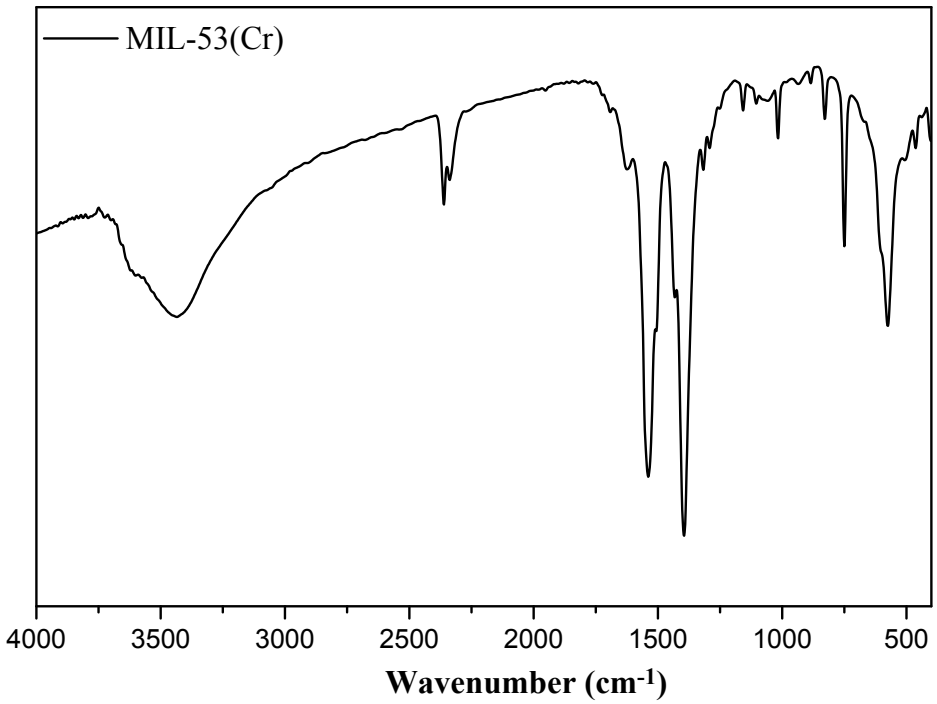

Figure S9. The FT-IR spectrum of MIL-53(Cr) synthesized using PET as the source of H_2BDC.

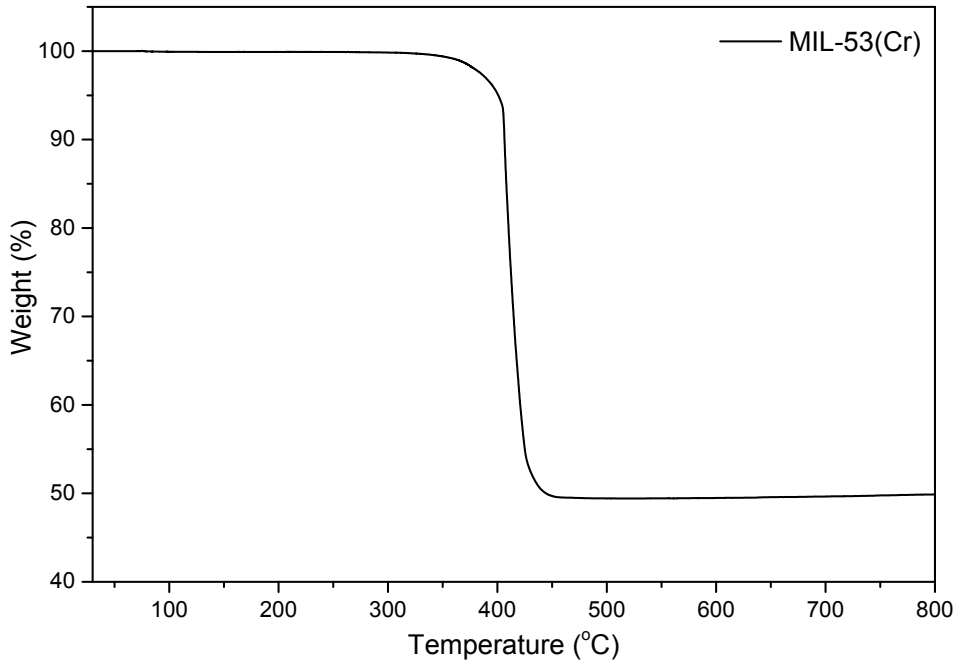

Figure S10. The TGA curve of activated sample of MIL-53(Cr) synthesized using PET as the source of H_2BDC.

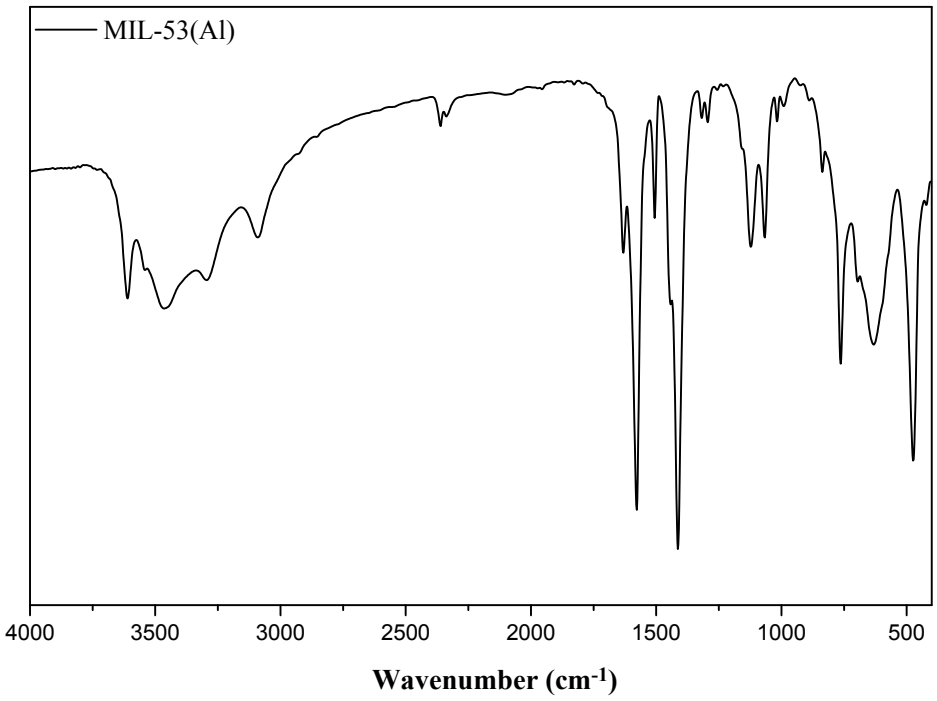

Figure S11. The FT-IR spectrum of MIL-53(Al) synthesized using PET as the source of H_2BDC.

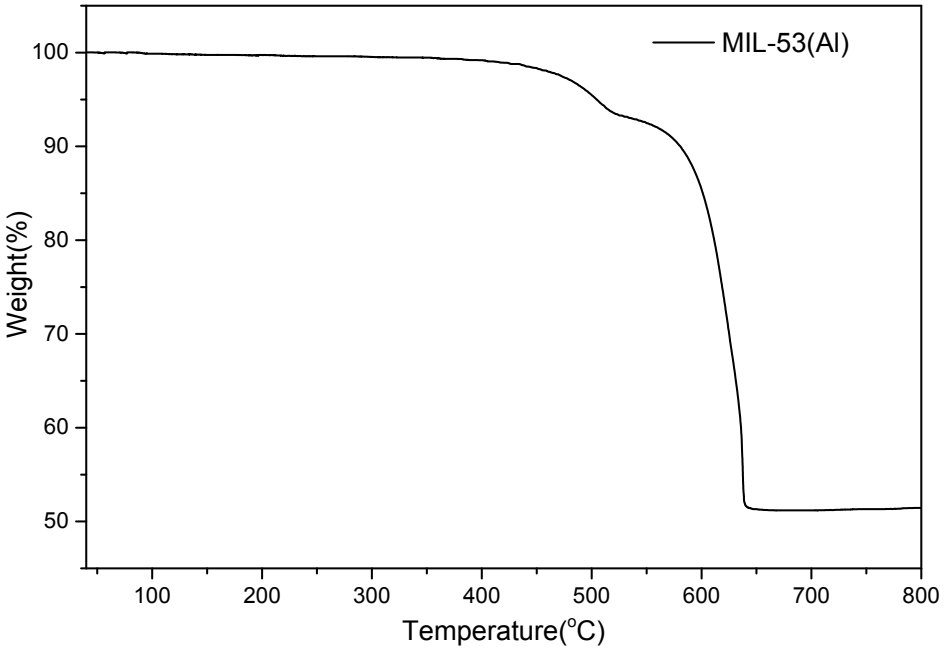

Figure S12. The TGA curve of activated sample of MIL-53(Al) synthesized using PET as the source of H_2BDC.

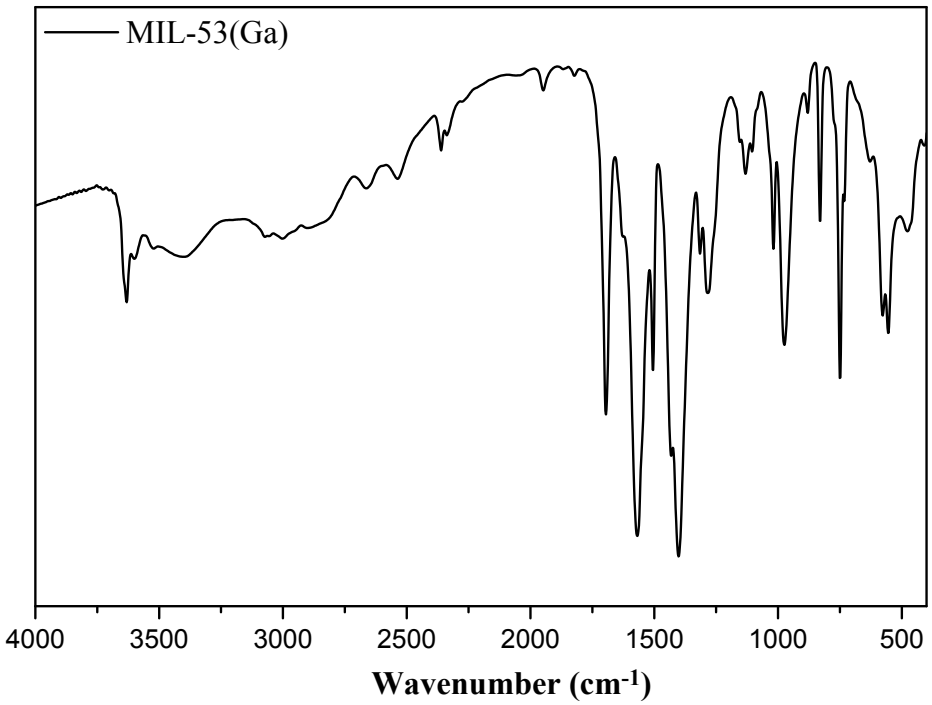

Figure S13. The FT-IR spectrum of MIL-53(Ga) synthesized using PET as the source of H_2BDC.

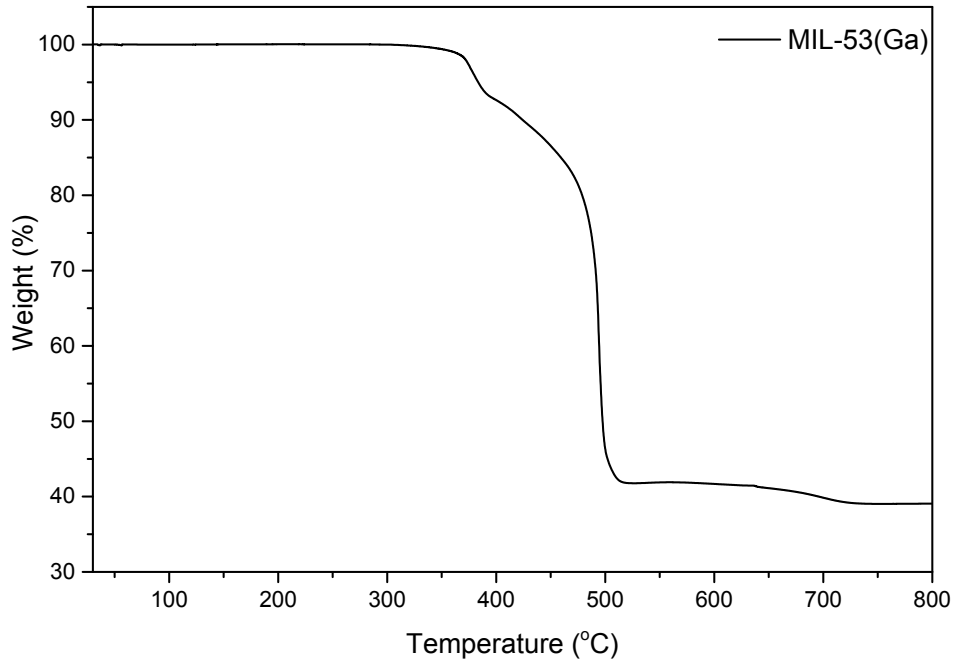

Figure S14. The TGA curve of activated sample of MIL-53(Ga) synthesized using PET as the source of H_2BDC.

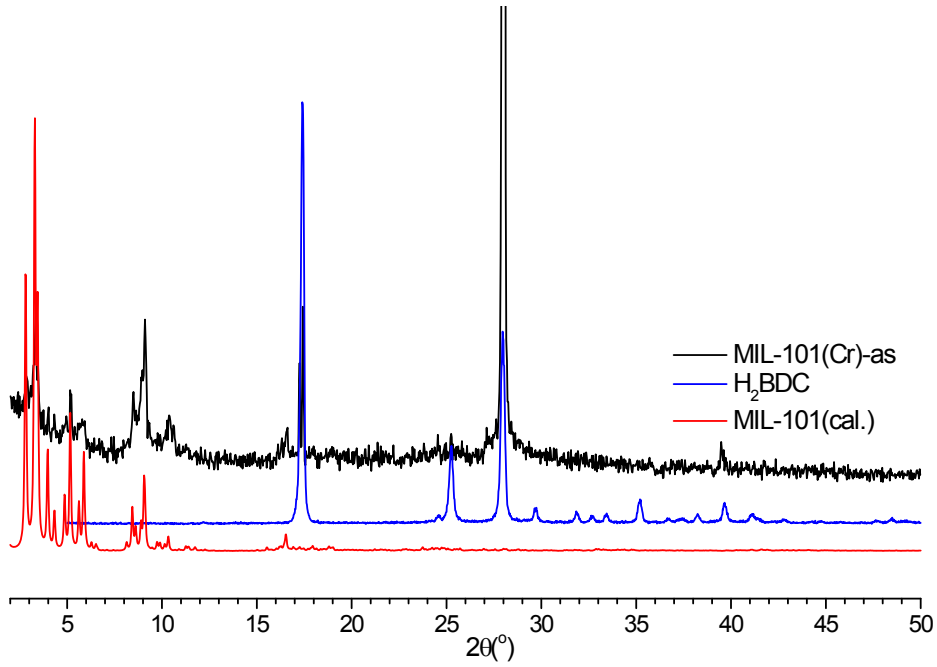

Figure S15. Comparison of PXRD pattern of the product obtained in the hydrothermal reaction of $CrCl_3 \cdot 6H_2O$ (1 mmol) with PET (1 mmol), HF (1 mmol), and H_2O (5 mL) at 220 ºC for 8 h for the synthesis of MIL-101(Cr) with calculated PXRD pattern of MIL-101 and PXRD pattern of H_2BDC.

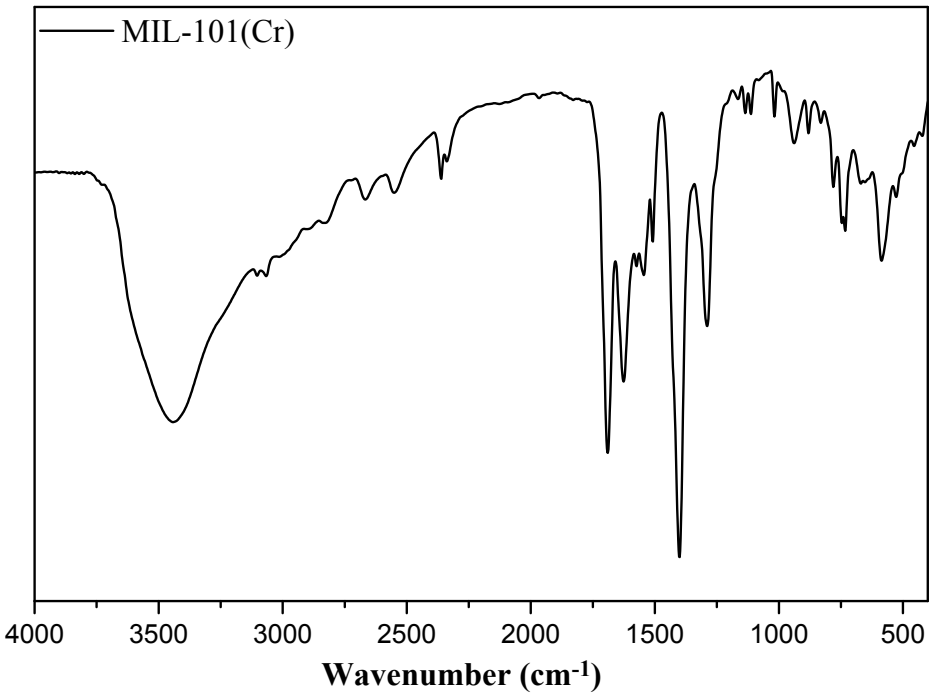

Figure S16. The FT-IR spectrum of MIL-101(Cr) synthesized using PET as the source of H_2BDC.

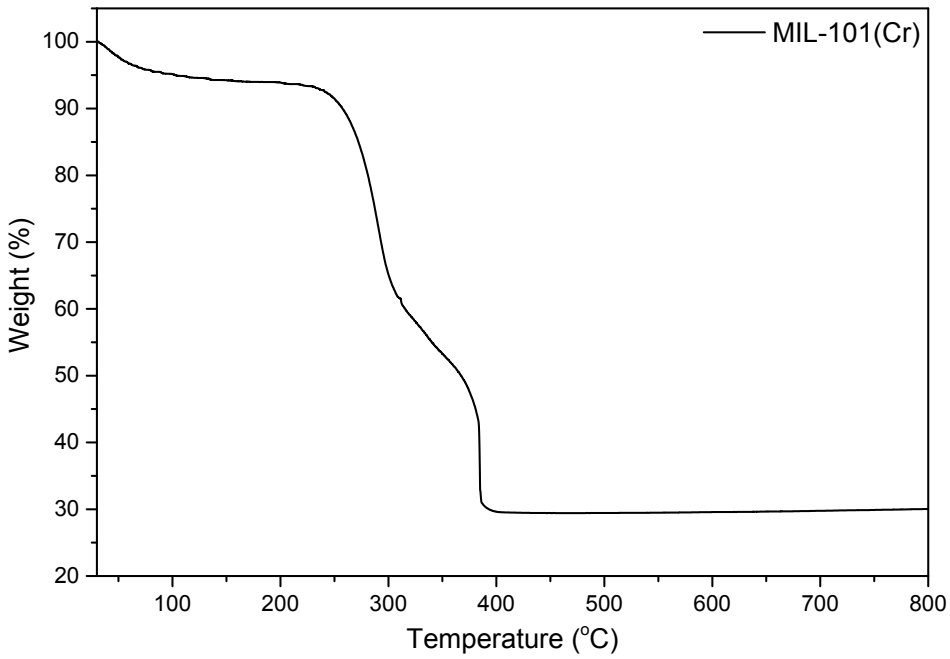

Figure S17. The TGA curve of activated sample of MIL-101(Cr) synthesized using PET as the source of H_2BDC.

Table S1. Coupling of propylene oxide (PO) and CO_2 to propylene carbonate (PC) catalyzed by various MOF/*n*-Bu_4NBr catalytic systems.

Entry	MOF	*n*-Bu_4NBr	Reaction Condition	Yield (%)	Ref.
1	MOF-5: 0.1 g	2.5 mol%	PO: 20 mmol, 6 MPa CO_2, 50 ºC, 4 h	97.6	66
2	Cu(tactmb): 0.125 mol%	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	47.5	67
3	HKUST-1: 0.125 mol%	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	49.2	67
4	MOF-505: 0.125 mol%	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	48.0	67
5	MMCF-2: 0.125 mol%	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	95.4	67
6	MMPF-9: 0.03125 mmol	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	87.4	68
7	HKUST-1: 0.0313 mmol	0.58 g	PO: 25 mmol, 1 atm CO_2, 25 ºC, 48 h	49.2	68
8	ZnGlu: 1.6 mol%	1.6 mol%	PO: 42.6 mmol, 1 MPa CO_2, 25 ºC, 24 h	92	69
9	Ni(saldpen)-MOF: 0.1 g	2 mol%	PO: 15 mmol, 2 MPa CO_2, 80 ºC, 4 h	86	70
10	In-MOF: 0.056 mmol	0.5 mmol	PO: 20 mmol, 2 MPa CO_2, 80 ºC, 4 h	93.4	71
11	HKUST-1: 0.2 mol%	10 mol%	PO: 20 mmol, 1 atm CO_2, 25 ºC, 48 h	65	72
12	MOF1: 0.2 mol%	10 mol%	PO: 20 mmol, 1 atm CO_2, 25 ºC, 48 h	96	72
13	ZnGlu: 0.47 mol%	0.94 mol%	PO: 42.6 mmol, 1.2 MPa CO_2, 25 ºC, 6 h	99	73
14	MIL-101(Cr): 0.2 mmol	0.3 mmol	PO: 18 mmol, 8 bar CO_2, 25 ºC, 48 h	82	74
15	MIL-101(Fe): 0.2 mmol	0.3 mmol	PO: 18 mmol, 8 bar CO_2, 25 ºC, 48 h	95	74
16	MOF-5: 0.2 mmol	0.3 mmol	PO: 18 mmol, 8 bar CO_2, 25 ºC, 48 h	67	74
17	MIL-47: 0.1 g	2.5 mol%	PO: 5 mL, 2 MPa CO_2, 50 ºC, 24 h	95	+

+: Present Work

Table S2. Coupling of cyclohexene oxide (CHO) and CO_2 to cyclohexene carbonate (CHC) catalyzed by various MOF/*n*-Bu_4NBr catalytic systems.

Entry	MOF	*n*-Bu_4NBr	Reaction Condition	Yield (%)	Ref.
1	UMCM-1-NH_2: 0.64 mol%	0.64 mol%	CHO: 42.8 mmol, 1.2 MPa CO_2, 25 ºC, 24 h	10	75
2	IL-ZIF-90: 0.49 mol%	-	CHO: 18.1 mmol, 1 MPa CO_2, 120 ºC, 3 h	9	76
3	MIL-101(Cr): 50 mg	0.62 mmol	CHO: 18 mmol, 8 atm CO_2, 25 ºC, 64 h	5	77
4	MIL-101(Cr): 0.1 g	5.0 mol%	CHO: 5 mL, 2 MPa CO_2, 80 ºC, 24 h	53	+
5	MIL-101(Cr): 0.1 g	5.0 mol%	CHO: 5 mL, 2 MPa CO_2, 80 ºC, 48 h	74	+
6	MIL-101(Cr): 0.1 g	5.0 mol%	CHO: 5 mL, 2 MPa CO_2, 80 ºC, 72 h	92	+

+: Present Work